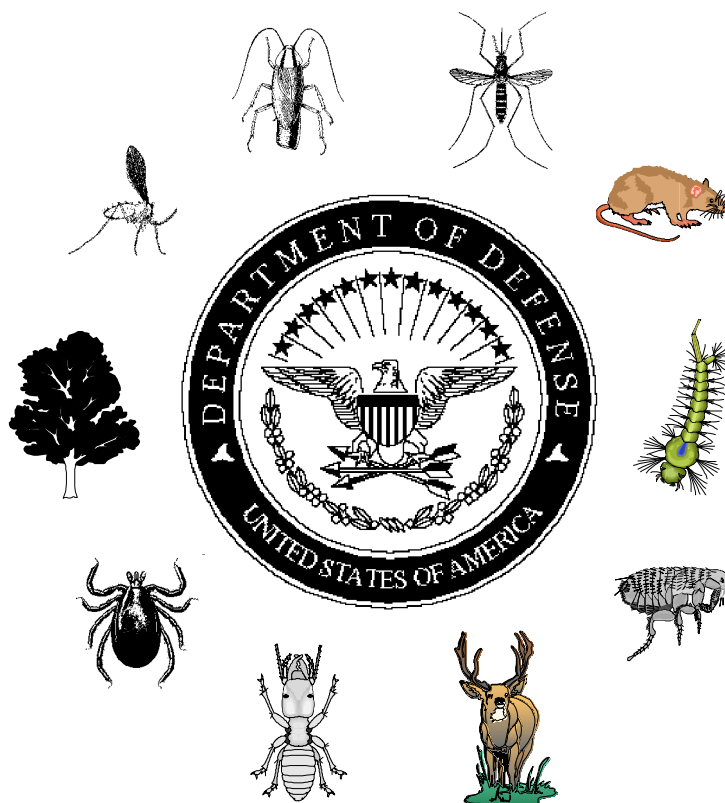


ARMED FORCES PEST MANAGEMENT BOARD

TECHNICAL INFORMATION BULLETIN

DEFENSE PEST MANAGEMENT INFORMATION ANALYSIS CENTER



NOV-DEC 1995

DEFENSE PEST MANAGEMENT INFORMATION ANALYSIS CENTER

ARMED FORCES PEST MANAGEMENT BOARD

FOREST GLEN SECTION, WALTER REED ARMY MEDICAL CENTER

WASHINGTON, DC 20307-5001

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TECHNICAL INFORMATION BULLETIN (TIB)

RECIPIENTS: The TIB is published by the Defense Pest Management Information Analysis Center to provide current information that may be of interest to the DoD pest management community. Comments, questions, and contributions are welcomed. Please send them to: Chief, DPMIAC/AFPMB, Forest Glen Section, WRAMC, Washington, DC 20307-5001, or call DSN 295-7479, (301) 295-7479; FAX (301) 295-7483. Reference to a commercial product or source in the Bulletin does not constitute DoD or AFPMB endorsement, unless specifically stated as a recommendation for DoD personnel. The Secretary of Defense has determined that publication of this periodical is necessary in the transaction of the public business, as required by law of the Department of Defense.



ANNOUNCEMENTS

AFPMB/DPMIAC Activities

- **DoD Instruction on the DoD Pest Management Program** - The final draft was mailed out to the AFPMB Council for coordination with a suspense of December 22. After this final review by the AFPMB Council, the instruction will be formally coordinated with the DoD Components. - CAPT Bolton, AFPMB.
- **DoD Plan for the Certification of Pesticide Applicators** - The AFPMB Council's comments are being addressed so the "Plan" can be formally coordinated with the Components. - MAJ Cannon, AFPMB.
- **DoD Manual on Pest Management Training** - The AFPMB Training and Certification Committee (TCC) reviewed the draft of DoD manual, 4150.7-M at its November 7 meeting. A second working group meeting is planned for January 30 to February 1, 1996 to prepare the final draft of this manual. - MAJ Cannon, AFPMB.
- **Measures of Merit (MOM)** - The Components have provided data for one measure of merit (pounds of pesticides used) in the base year FY1993. So far, only the Air Force and DLA have provided data for all three measures for FY1994. The problem for the Army and Navy is compiling the data above the installation level. Letters to the Components clarifying the data requirements for these MOMs and asking for the FY95 data were signed out by Ms. Goodman on November 22. - CAPT Bolton, AFPMB.
- **Pesticide Use/Risk Reduction Partnership with EPA** - The EPA wants to include the DoD pesticide use reduction initiative in their new Pesticide Environmental Stewardship Program (PESP). The AFPMB worked with the EPA to develop a Memorandum of Understanding (MOU) that formalizes our participation in PESP. This MOU was signed by Ms. Goodman and by Dr. Goldman, the Assistant EPA Administrator. We are also working with the EPA to develop a set of guidelines for requesting proposals for IPM demonstration projects from the Components. - LtCol McKenna, AFPMB.
- **State Memoranda of Agreement** - Each of the 38 state pesticide regulatory offices is contacted during the anniversary month of their MOA for coordination and information exchange. This month we will review and update our MOAs with Arizona, Rhode Island and Wyoming. - COL Driggers, AFPMB.
- **Pest Management Module for DESCIM Migratory System** - The Integrated Decision Paper is complete and has been forwarded for final approval. - Mr. Stevenson, AFPMB.
- **Memorandum of Understanding (MOU) on Biological and Toxicological Testing of Pesticides between DoD and U.S. Department of Agriculture (USDA)** - This MOU, which coordinates efforts between DoD and USDA on insect repellent development, has been revised by the U.S. Army Medical Command and signed by The Army Surgeon General. Coordinations are out to the Navy, USDA and DUSD(ES). - COL Driggers, AFPMB.
- **1996 Research Review Update** - Invitations have been sent out to key research leaders and scientists at U.S. Department of Agriculture laboratories. The 1996 review, which will be held in Gainesville, Florida from January 23-25, will focus on DoD's requirements to reduce pesticide risk while maintaining disease vector and pest control capabilities. - Maj Carpenter, AFPMB.

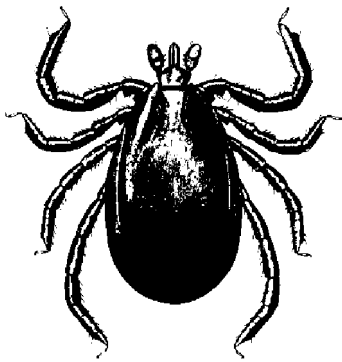
New USDA, Agricultural Research Service Administrator Named - Dr. Floyd P. Horn was named Administrator of the USDA, ARS. He will oversee USDA's agricultural research arm, including pest management, food safety and biotechnology, human nutrition, and other areas of interest to DoD. His appointment fills the vacancy created when Dr. Ronald D. Plowman retired in September 1995. Dr. Horn's background is in animal science, in which field he has worked for 24 years as a scientist, research leader, and administrator. Most recently, he served as the USDA's Deputy Under Secretary for Research, Education, and Economics. He is the author of numerous scientific publications and has received several awards for his

contributions. **AFPMB Note:** The USDA performs a wide range of research of vital interest to the DoD at several labs within the ARS. ---- USDA, ARS Press Release, 16 Oct 1995, and e-mail 26 Oct 1995.

Center for Vector-Borne Disease Research Formed at UC Davis - The Arbovirus Unit of the Division of Epidemiology and Public Health Biology, School of Public Health, University of California, Berkeley, has closed its doors after more than 50 years of key field and laboratory research on arthropod-borne viruses. Remaining staff, equipment, and funding have been transferred to the University of California at Davis, to form the nucleus of the newly established Center for Vector-Borne Disease Research in the Department of Pathology, Microbiology and Immunology, School of Veterinary Medicine. Research on mosquito-borne viruses of medical and veterinary importance will continue, and research efforts will expand to include additional vector-borne pathogens of national and international interest. ---- ESA Newsletter, Sep 1995, p. 13.

INTEGRATED PEST MANAGEMENT

Leaf Litter Removal Reduces Ticks Without



Pesticides - Removal of leaf litter in wooded areas of residential communities significantly reduces the abundance of questing black-legged tick (*Ixodes scapularis* Say) nymphs throughout their peak activity period. Using hand rakes and leaf blowers during early spring (March) and early

summer (June), leaf litter removal efforts reduced nymphal tick densities by 72.7 to 100%. Subsequent sampling of the tick population during the summer revealed similar rates of suppression of larvae. Although leaf removal provides levels of suppression similar to more traditional methods, including chemical acaricides, it is labor intensive and not free of possible nontarget effects (including improving habitat for hosts, exposing nontarget organisms to unfavorable temperature and humidity conditions, disturbing sensitive plant roots, and providing a dryer and subsequently better refugia for subadults). The removal

of leaf litter in wooded areas is so labor intensive compared with acaricide applications that it would have limited appeal and be cost prohibitive as well as impractical in some situations. However, removal of leaves in subsequent years would require less effort and, despite potential drawbacks, litter removal may provide an effective tool in an integrated landscape approach to Lyme disease management. ---- Journal of Medical Entomology 32(5): 730-733 (1995).

Glossy Public Information Material Reduces Pesticide Risk - In a study conducted in low and middle income neighborhoods in two Florida cities, researchers showed that backyard cleanups of mosquito development sites initiated by three different literature campaigns produced significantly different results. The study indicated that 4-color-process literature significantly reduced the number of artificial containers with or without active mosquito development in both locations compared to no literature or black-and-white literature treatments. More important, there were no differences between residences receiving the black-and-white literature and residences given no literature. Thus, an effective educational campaign using glossy literature to encourage residents to clean up mosquito-breeding sources may significantly reduce the number of mosquitoes and the need for pesticides.

In the southeastern United States, low and middle income urban areas contain large numbers of artificial containers that are known development sites for *Aedes aegypti* (Linn.), *Aedes albopictus* (Skuse), *Aedes triseriatus* (Say), *Culex nigripalpus* Theobald, and *Culex quinquefasciatus* Say. Ground adulticiding, although generally practiced, is only partially effective against diurnally active *Ae. aegypti* and *Ae. albopictus*. For many urban mosquito species, especially *Ae. aegypti* and *Ae. albopictus*, source reduction, although labor intensive and expensive, can significantly reduce potential development sites and, subsequently, adult populations. Source reduction is conducted during residential inspections by mosquito control personnel or by residents after having been given some information, often in the form of a pamphlet.

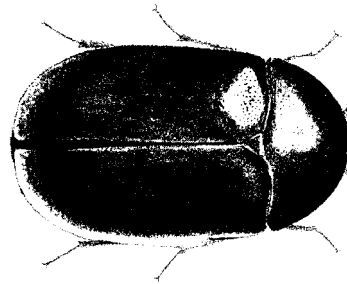
Low income areas generally are characterized by a large number of containers that harbor *Ae. aegypti*. Detailed surveys conducted by the Centers for Disease Control, DHHS (CDC), indicate that such areas have consistently higher *Ae. aegypti* incidences. Furthermore, the type, shape, and location of the containers influence the number of foci and the magnitude of *Ae. aegypti* infestation. With the continued spread of *Ae. albopictus* via the used tire industry, mosquito surveys in tire piles and in urban

areas throughout the southeastern United States have become more common. Clearly, container reduction is an essential part of a mosquito reduction program. **AFPMB Note:** This study demonstrates the importance of good communication in an integrated pest management program! Educating your "customers" can contribute significantly to your own effectiveness, enhance the quality of your service, reduce pesticide risk, and reduce your outlay for pesticides. ---- Journal of the American Mosquito Control Association 11(2): 186-190, 1995.

Pesticide-Free IPM Information - A supplement to the June 1995 Journal of the American Mosquito Control Association contains a wealth of information on control of arthropod vectors without the use of chemical pesticides and addresses other aspects of sustainable integrated pest management. The papers are derived from presentations by experts during a symposium held at the Sixtieth Annual Meeting of the American Mosquito Control Association in San Diego, California, April 11, 1994. Titles include: Vector Control without Chemicals: Has it a Future?, by B. F. Eldridge; Control of Tsetse Flies with the Aid of Attractants, A. M. Jordan; Vector Control without Chemicals: A Public Health Perspective, J. A. Mulrennan, Jr.; Biocontrol from a Mosquito Control Director's Point of View, E. J. Beidler; The Future of Microbial Insecticides as Vector Control Agents, B. A. Federici; The Future of Insect Growth Regulators in Vector Control, M. S. Mulla; The Present Safety Assessment of DEET, T. G. Osimitz and R. H. Grothaus; Regulatory Factors Affecting Larval Mosquito Populations in Container and Pool Habitats: Implications for Biological Control, J. O. Washburn; Computer Models: Killing Mosquitoes with Information, F. C. Roberts; Can We Control Mosquitoes without Pesticides? A Summary, M. W. Service. This supplement is an excellent source of information about pesticide-free arthropod control. ---- Journal of the American Mosquito Control Association 11(2), Pt 2, Jun 1995.

IPM Success Stories - Personnel in the DoD are shifting from traditional pest control programs to integrated pest management. MAJ Thomas Logan, Chief, Entomological Sciences Division, CHPPM-EUR, reported the following recent successes in IPM:

- Entomologists directed commissary officials to freeze insect infested products as a nontoxic alternative to fumigation to control two species of medically important beetles and one other species that had infested more than 1,500 pounds of food at commissary facilities in Saudi Arabia. Several suspected but uninfested stocks were identified and spared from treatment or condemnation. Before receiving advice from the



entomologists, Army veterinarians had condemned more than \$2,200 worth of insect infested food. Entomologists also trained personnel in preventing, detecting, and managing stored product infestations.

- Entomologists identified rodent harborage and feeding sites and gave 16 recommendations for long-term, nontoxic control measures such as trapping, proper food storage, pest exclusion, and preventive maintenance. A final recommendation instructed personnel in the safe and proper use of rodenticides.
- Entomologists recommended nonchemical measures to control insects infesting food products at a military food distribution center in Germany. Immediate isolation of the infested products was emphasized to warehouse officials. Following that, freezing was recommended as an alternative to fumigation of any products that were to be recouped. Prompt disposal was recommended for any products not recouped. Entomologists also recommended intensifying food inspections and using pheromone traps for early detection of infestations.
- Entomologists suggested several nontoxic, long-term measures to control birds and rats at depot warehouses in Germany. These measures included trapping, proper stock rotation and warehousing practices, and pest proofing and preventive maintenance of the buildings.

These are only a few examples of alternatives to traditional pest control measures. If you have an IPM success story, please send it to DPMIAC for

inclusion in a future TIB.

Preventive Medicine for the Future

The Navy Disease Vector Ecology and Control Center, Jacksonville, Florida, has embarked on yet another endeavor to support Navy Preventive Medicine: the establishment of the Environmental Security Department. This department is tasked with promoting the Environmental Security Program Initiatives of the Department of Defense (DoD) relative to public health pest management at ashore and afloat activities and in field operations. The mission of the DoD Environmental Security Program is to strengthen national security by integrating environmental, safety and health considerations into our defense and economic policies and to ensure responsible performance in DoD operations. The premise for this program is that investing in preventive measures is the best way to protect health and the environment. The Environmental Security Department serves as an avenue through which environmental security concepts related to pesticide use and public health pest management are translated into easily understandable goals and procedures at the field level. This interface promotes "up front" process evaluation and control instead of the "end of pipe" method so frequently used.

The department is committed to advocating environmental awareness in preventive medicine efforts supporting Force Readiness. Raising these commitments to the department level demonstrates the need for cross-functional communication between medical, environmental, facilities and other service support elements and the Fleet and Fleet Marine Force.

The primary role of the DoD pest management program is to support operational readiness by (1) protecting DoD personnel and deploying forces from vector-borne diseases and (2) having sound installation pest management programs that protect facilities, materials, and subsistence from pest damage. A significant DoD pest management initiative is to carry out the readiness mission while achieving 50 percent reduction in pesticide use by FY00 (based on FY93 data). This initiative and pollution prevention, one of the most important pillars of the Navy environmental program, are one focus of the Environmental Security Department. To support this initiative and pesticide pollution prevention, the Environmental Security Department evaluates pesticide use reduction at field activities through Environmental Security Reviews. The department recently completed visits to all naval

NAVY

installations with in-house pest management operations in Georgia, Florida and South Carolina, recommending depletion or transfer of more than 75 public health pesticides. Initial efforts promoting inter-activity transfer of pesticides have saved ashore and afloat activities more than \$18.5K in pesticide costs. This does not include funds saved from potential expenses of hazardous waste disposal. Admittedly, the cost savings are small, but the improved environmental and health-associated effects may be significant. Other efforts to reduce the amount and kinds of organophosphate and carbamate pesticides also will help reduce pesticide exposure and possibly alleviate the need for medical surveillance of pesticide applicators.

The Environmental Security Department addresses issues at the operational level where fundamental changes in environmental stewardship and health promotion can be established and have substantial impact on day-to-day activities. Carrying out environmental security programs requires more than just incorporating environmental awareness into existing programs - it requires a profound cultural change and reorientation of current environmental concepts. Promoting and pursuing devoted efforts in environmental protection, occupational health, safety, and preventive medicine provide the framework for continuous improvement in our state of readiness. We believe this action is preventive medicine for our future. --- LCDR William Dees.

PESTICIDES & EQUIPMENT

Reclassification of Metam-Sodium Sewer-Use Products as Restricted Use Pesticides

The Environmental Protection Agency (EPA) is implementing requirements that all metam-sodium products intended for use in sewer systems to control root growth be labeled "Restricted Use Pesticides". The labeling change affects all products sold or distributed after March 1, 1996. A manual for use in certification and training programs was distributed to the states and the DoD in September 1995. Activities or organizations that wish to purchase and use metam-sodium must have a certified employee or hire a certified commercial applicator. ---- MAJ Cannon, AFPMB.

Electrostatic Sprayers Improve Pesticide Efficacy, Reduce Applicator Exposure - In a 3-year study, University of California scientists evaluated one of the newer candidate electrostatic sprayers. Under the study



conditions, electrostatic application provided control that was equal or superior to conventional full-volume spray, while using 40 times less water in an equivalent area. In addition, electrostatic application provided 3.7 times more foliar deposition than the use of conventional full-volume sprays, and residues were more difficult to remove mechanically. Therefore, residues from electrostatic application were less hazardous to worker health and safety than conventional full-volume wet sprays.

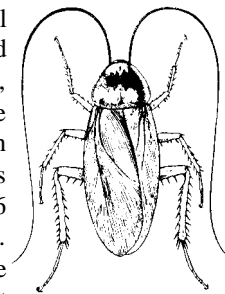
Application of pesticides in some situations is dominated by the use of fully dilute wet sprays and the "spray to runoff" concept. Applications commonly amount to 100 to 800 gallons per acre, depending on the type of plant, its stage of growth, and the target pest. This is a grossly inefficient use of pesticides, with less than 1% of the active ingredient applied actually reaching the target pest. Despite this lack of efficiency, the ease, convenience and familiarity of this application method have made it routine among applicators. In addition, pesticide labels reinforce this application technology and have contributed to continued dominance of dilute sprays in some uses. This type of pesticide application is clearly inconsistent with the principles and practices of integrated pest management (IPM), which strives for conservative and efficient use of pesticides, with the absolute minimum amount entering nontarget areas. Reduced volume application resulted in significantly longer persistence of foliar residue, which is not only positive for pest control, but also for its potential impact on worker health and safety, which is of paramount importance.

Electrostatic techniques look promising and this study satisfies some concerns about the safety aspect, but additional research is needed on different pesticides and application conditions that might be encountered. Two major concerns are applicator exposure and spray concentration. If the spray is directed away from the applicator, there is little problem of contact because the charged droplets are attracted to the plants where the spray is directed. However, the higher concentration used in the spray tank of electrostatic and other low-volume, high-concentrate sprayers is a problem from a pesticide labeling perspective. The pesticide label is the law. If a statement is made on the label specifying voluminous dilution rates and the label does not otherwise suggest the use of "concentrate sprays," then it is illegal to use the pesticide in concentrate sprays because it is inconsistent with the label. In essence, some labels allow legal application of an unlimited amount of pesticide active ingredient per acre, but forbid use of reduced volume sprayers that may apply greatly

reduced rates of pesticide active ingredient. The labels of many newer pesticides include directions for use in reduced-volume ("concentrate") sprayers and foggers. The future "fast-track" registration process for biorational pesticides may allow more efficient application techniques. Currently, applicators who wish to use reduced volume application systems are limited to pesticides labeled specifically for that use. ---- California Agriculture, Jul-Aug 1995, 31-35.

Repellent May Cue Cockroaches to Avoid Areas Where Others Have Died

Ethanol extracts from the bodies of male and female American cockroaches, *Periplaneta americana*, were demonstrated to repel American cockroaches of all ages and sexes from shelters at a dosage above 1.6 cockroach-equivalents per shelter. Repellents are currently not effective for management of cockroaches, but they could be used to restrict the pests from particular areas. If capable of overriding aggregation pheromone in harborage, a repellent might be applied in combination with attractive traps to control moderate infestations. There is currently no commercial repellent available that might create pest exclusion zones. In a study reported recently, the repellent was found to be endogenously produced, distributed throughout the bodies of individuals of both sexes, and effective against at least four other species of cockroaches of diverse phylogenetic relationship, including the German cockroach, *Blattella germanica*, a common pest of dwellings and food-handling facilities. There was no evidence that the repellent is released by living insects as an alarm pheromone. The active materials, unsaturated fatty acids, differ from the proteinaceous dispersion-inducing substance produced by living German cockroaches. There was no evidence that the new repellent was released from living cockroaches, even at very high population densities. Cockroaches were repelled, however, by intact and ruptured corpses. The repellent may function as a cue for avoiding areas where other cockroaches have died. A literature review suggests that unsaturated fatty acids may elicit avoidance of dead conspecifics in many groups of invertebrates. **AFPMB note:** More research is needed to further define the ecology of this repellent, but it shows potential as another weapon in the arsenal against cockroaches. It could be used to significantly reduce the amount of pesticide needed to control cockroach infestations, and thus reduce pesticide exposure risks. ---



- Environmental Entomology 24(1) 116-124 (1995).

MEDICAL ENTOMOLOGY

Pyrethroid-Treated Bednets Reduce Mosquito Biting

- In a study set in a rural area of Zaire, the entire population of a village was protected from biting mosquitoes by deltamethrin-impregnated bednets. Results were compared to those from a similar village observed as a control, in which bednets were not used. The principal man-biting species were *Mansonia africana*, *Mansonia uniformis*, and *Aedes aegypti*. Insecticide-impregnated bednets have been used successfully in several countries, including China, Gambia, Burkina Faso, and Zaire. In the Zaire study, treated bednets reduced the number of bites from the malaria vector *Anopheles gambiae* by 94%. Parasite inoculation rates in the treated area were similarly reduced. Other pests, such as bedbugs, ticks, and lice were also controlled by the treatment. The number of *Mansonia* bites was reduced 96% indoors and somewhat less outdoors. Biting rates of *Ae. aegypti* dropped to zero indoors, but the outdoor biting rate remained unchanged. The study concluded that the reduction in mosquito bites was caused not only by the repellent action of the deltamethrin but also by a reduction in mosquito numbers. **AFPMB Note:** The pyrethroid pesticide was applied only to bednets, not to clothing or other furnishings, and no pesticide was broadcast into the air or water, thus the risks from those routes of exposure were eliminated. A reduction in the number of mosquitoes could reduce the number of pesticide applications required to control a population, and the consequent decrease in biting would mean less potential for exposure to pathogens. ---- Journal of the American Mosquito Control Association 11(2): 191-193.

African Trypanosomiasis in Zaire

- Trypanosomiasis has ravaged central Africa for centuries. Colonial administrations organized effective campaigns for sleeping sickness control in the French, Belgian and English colonies. Their strategies included systematic and regular case-finding in whole populations by specialized and well-equipped mobile teams, early and effective treatment of all cases found, adequate follow-up for three years minimum of all cases treated, strict control



of individual and group movements through the use of health cards, and **massive action against the tsetse fly**.

Anti-tsetse fly actions included placement of fly traps in villages and near cattle ranches, cutting fly-harboring brush along all streams and water sources where people might gather, strict control over the movement of cattle and other domestic animals (no cows or pigs allowed near villages), and forced removal of villagers from infected areas to break the transmission cycle. These campaigns reduced rates of infection to less than two per ten thousand.

Since the early 1960s, these measures have dwindled, and some have disappeared. National and regional programs continue in most countries, but all are underfunded and under-equipped. Almost all programs for fly control have disappeared, and cattle raising now occurs in most villages without adequate safeguards. At the Vanga Hospital in the Bandundu Region of Zaire, health care providers have seen a slow but steady increase in the number of cases: in 1992, 16 new cases were referred to the hospital and treated, 62 new cases in 1993, 58 in 1994, and from Jan - 15 Oct 1995 there have been 63 new cases. HealthNet Zaire suspects there are now tens of thousands, perhaps hundreds of thousands, of active undiagnosed cases in Zaire, with an almost 100% fatality rate when untreated, but at least a 90% cure rate if treated in time.

HealthNet Zaire has formulated a plan of attack to reduce the incidence of trypanosomiasis that includes fly control as a major element. Plans for fly control include making indigenous fly traps (which are said to be of poor quality because of lack of good materials and the expense of good cloth, but increased production and improved quality are planned), extensive education of the population with emphasis on reporting suspect cases quickly, and removing all cattle and domestic animals from villages. ---- Dan Fountain, HealthNet Zaire, (vanga@zre.healthnet.org); PROMED-EDR: Trypanosomiasis - Zaire; 14 Nov 1995; via promed-edr@usa.healthnet.org.

USDA, ARS and France Cooperate on Insect Genetic Technology

- Medflies and malaria are two targets of a new international research agreement between the USDA, Agricultural Research Service (ARS) and France's national agricultural research center (Centre National de la Recherche Scientifique) which have begun collaboration to develop reliable gene-transfer methods for insects and other invertebrates. This could speed progress in agriculture, aquaculture, and health



objectives important in many countries. Giving mosquitoes genes to keep them from transmitting the parasite that causes malaria might reduce the human death toll, which is estimated at 2.7 million people each year. In June, an ARS insect geneticist went to France to work with a University of Montpellier insect pathologist for four months. They are using cotton leafworms and Mediterranean fruit flies as experimental models to prove the concept. Medfly gene transfer has several potential uses, such as distinguishing beneficial sterile medflies from destructive fertile ones. Another potential application is enhancing freeze tolerance in insects mass-reared for biocontrol; they could then be held in "suspended animation" until needed for release. Currently, such insects must be released when they reach the desired life stage. **AFPMB Note:** Genetic research is beginning to show big paybacks after years of foundation-laying research. ---- USDA, ARS "Science Update," Agricultural Research, Sep 1995, p. 23.

Mosquitoes Stalk the International Airways - Infected mosquitoes traveling on airliners flying international routes from the tropics were blamed in August 1995 for an outbreak of malaria in Belgium, where malaria is not endemic and is usually only seen as of imported cases. Three Belgians were diagnosed with malaria contracted through mosquito bites received at Brussels International Airport, according to Belgian health inspectors. **AFPMB Note:** "Airport malaria," i.e., human malaria contracted outside endemic areas from bites of parasite-infected mosquitoes transported on aircraft, still presents a hazard in and around airfields. This type of transmission is especially worrisome for USAF, Air Mobility Command flights, many of which originate in or transit tropical areas where malaria is endemic. This type of transmission should also serve as a reminder of



the need for proper quarantine procedures and pest management programs. ---- The International Herald Tribune, 7 Sep 1995, via PROMED, promed-edr@usa.healthnet.org.

NATURAL RESOURCES

Environmentally and Socially Responsible Refuge Management - Mosquito and vector control districts are always faced with planning seasonal control



tactics based on variables that may be beyond their managers' ability to predict. However, for those programs operating in and around federal wildlife refuges, problems may be multiplied. Federal refuges produce mosquitoes and other disease vectors that impact people living within the flight or outmigration range of these insects. Saltmarsh mosquito control in Delaware provides a specific example. Saltmarsh mosquitoes breed prolifically in Delaware's two national wildlife refuges. They routinely fly considerable distances off-refuge, impacting human quality-of-life, public health, and local economies.

The responsibility for mosquito and other disease vector control resides with the state, county or local control program. It is important that these programs have the ability to control such pests on-refuge in an environmentally compatible manner that is cost effective and minimizes nontarget impacts. As one official noted, "Waiting to control mosquitoes until after they've left the refuge is environmentally irresponsible. It eliminates nonchemical source reduction options and always requires much more insecticide use than with on-refuge treatments."

In most states, private landowners and state property holders are held responsible for the inadvertent creation of nuisances and risks. However, Federal refuges are not required to be responsible and often do little to reduce nuisance or health risks for residents, or the financial burden they create for mosquito and vector control districts. The discussion of needs and methods to control mosquitoes or other vectors in national wildlife refuges near populated areas is often contentious.

In June, the Scientific and Regulatory Committee of the American Mosquito Control Association (AMCA) recommended language that would require the Federal Wildlife Refuge Administration to consider the impacts refuge and system operations might have on the health and well-being of humans who use refuges, or who live nearby, and take reasonable steps to reduce these impacts. If adopted, the changes would promote sharing of responsibility for management of pest problems and would lead to improvement in nuisance and health-threatening situations created by federal properties that do not currently consider pest management a priority, while preserving the essential functions of the refuges in land and wildlife management programs. ---- Refuge Management, AMCA Vector Review, Nov-Dec 95, pp. 20-21.

HAZARDOUS WASTE & TOXIC

SUBSTANCES

Ag Waste Takes on Toxic Metals - ARS researchers have proved that agricultural wastes can be used to scavenge toxic metals from industrial wastewater. Current removal methods are costly, especially for small and medium-sized wastewater producers. The ARS researchers' new approach is to produce granular activated carbons (GACs) from plentiful ag by-products. These include hulls of soybeans, cottonseed, and rice. To make GACs, high heat and steam turns a mix of by-products, such as blackstrap molasses plus ground-up hulls, into tiny pitted granules. A pound of these GACs has more than 100 acres of surface area—lots of room to snare metal particles. In ARS lab tests, the agri-GACs removed up to 100 percent of the zinc and almost all the copper and nickel from wastewater. That's at least as effective as GACs made with coal, which is a nonrenewable resource. In addition, GACs from ag by-products may be cheaper to produce. To ready this technology for electroplating, jewelry, and other industries, ARS entered a cooperative R&D agreement with Z Corporation of Albuquerque, New Mexico. **AFPMB Note:** This same technology could benefit DoD operations that produce wastewater containing toxic metals. ---- USDA, ARS "Science Update," Agricultural Research, Sep 1995, p. 23.



Bacteria Dine on Weed Killers - ARS researchers have found a pesticide-gobbling "Mr. Clean" microbe in an unlikely place — municipal sewage sludge. The *Klebsiella terrigena* bacterium may be ideal for breaking down weed-killing chemicals in water rinsed from tractor-pulled spray tanks. That would free pesticide applicators from having to store contaminated rinse water while searching for an environmentally safe disposal site. Treating the rinse water requires two 55-gallon, cone-shaped tanks. A generator pumps the ozone gas through rinse water in one tank for 12 hours. Then the water is pumped into the second tank with the *Klebsiella* bacteria. In 24 hours, little remains but carbon dioxide and water that farmers can safely dump on the ground. *Klebsiella* degrades three major herbicides—atrazine, cyanazine, and simazine. Earlier, researchers identified other microbes to break down alachlor, metolachlor, and 2,4-D. **AFPMB Note:** This is yet another environment-enhancing product of

research by USDA, ARS scientists. ---- USDA, ARS "Science Update," Agricultural Research, Sep 1995, p. 23.

TIB BYTES

ARS Pesticide Database on the Internet - The USDA, Agricultural Research Service's Pesticide Database is now available worldwide on the Internet. It covers hundreds of pesticides, including more than 95% of those most used for controlling weed, insect, and fungal pests. For each pesticide, the database describes up to 16 chemical, physical, and biological features that influence its breakdown rate and likelihood of entering surface or groundwater. The data can be used in crop and soil computer models that account for soil, temperature, and other local factors that affect pesticides. The database can be accessed on the World Wide Web site of the ARS Systems Research Laboratory, at <http://www.arsusda.gov/SRLHome.htm>. ---- Science Updates, Agricultural Research, November 1995, p. 23.



Outbreak Page Launched on World Wide Web - A new World Wide Web site called Outbreak was launched in October for beta testing with material on a variety of emerging and re-emerging diseases. A Scientific Review Team will review coverage of diseases addressed on the page. The page will be integrated with additional communication technologies and improved as it matures. **AFPMB Note:** This page will be very useful for DoD preventive medicine professionals and provides an ideal opportunity for members stationed in remote and/or "hot" locations to supply key information on disease status to the international community. The URL is: <http://ichiban.objarts.com/outbreak-unreg/index.html> ---- PROMED, 23 Oct 1995.

World Wide Web Home Page for Virology Sites - "All the Virology Sites on the WWW" (<http://www.tulane.edu/~dmsander/garryfavweb.html>) has recently been updated. This comprehensive page lists Servers for General Virology, Specific Viruses, Microbiology, AIDS, Emerging Viruses, Electronic Journals, Scientific Societies, Patent and Legal Information, Government Sites and much more. The updated table of contents follows:

Institutional General Virology Servers
Electron Micrographs & Macromolecular Images of

Viruses

Taxonomy and Phylogeny of Viruses
Viral Genome Sequence Data
Graduate Programs in Virology
On-Line Virology Courses and Tutorials
Institutional Microbiology Servers
Plant Virus Servers and Information
Specific Virus Servers and Information
Adenoviruses
Animal Viruses - Bovine, Equine, etc.
Arboviruses - Insect (arthropod-borne)
Viruses, Flockhouse
Bunyaviridae - Hantavirus
Filoviridae - Ebola
Herpesviridae -- Herpesviruses
Cytomegalovirus (CMV)
Epstein Barr Virus (EBV)
Papoviridae - Papillomaviruses
Picornaviridae
Enteroviridae - Polio Viruses
Rhinoviridae - Rhinoviruses
Retroviridae - Retroviruses
A-Type Retroviruses (HIAP,
Human Intracisternal
Particles)
Immunodeficiency Viruses
(HIV-1, HIV-2)
Leukemia Viruses (FLV)
Reoviridae - Reoviruses
Rhabdoviruses - Rabies Viruses
Togaviridae
Flaviviridae- Hepatitis C Viruses

More Internet Resources for Virologists:

AIDS Information/Research (See HIV info also)
Emerging Viruses Information/Research
Other Health Organizations
Scientific Societies of Interest to Virologists
Online Access to Journals of Interest to
Virologists
Government Agencies of Interest to Virologists
Patents & Legal Resources
Other Lists of WWW Links for Virologists
Usenet Newsgroups for Virologists
WWW Searching Options

This page is updated often. Any submissions, additions or corrections are appreciated. The page is maintained through the Garry Lab at Tulane University School of Medicine in New Orleans, by David M. Sander, Department of Microbiology and Immunology, SL38, Tulane University Medical School, 1430 Tulane

Avenue, New Orleans, LA 70112-2699. Phone: (504) 586-3818 (lab), 588-5150 (Dept.), fax: (504) 588-5144 (Dept.), E-Mail: dmsander@mailhost.tcs.tulane.edu. ---- David M. Sander (dmsander@mailhost.tcs.tulane.edu): PROMED: Virology Sites on the WWW, 3 Nov 1995, via promed@usa.healthnet.org.

TIB BITS

Available Information on the Former Yugoslav Republics (FYR) - Individuals seeking information on Bosnia can find it on the Internet. BosniaLINK, a new site on the Internet with information on Bosnia, is now open. The Department of Defense information service provides current information on the NATO peacekeeping mission Operation JOINT ENDEAVOR. The address is: <http://www.dtic.dla.mil/bosnia/>

The Disease Vector Ecology Profile (DVEP) on the FYR is now available on the Armed Forces Pest Management Board Home Page on the Internet. The DVEP can be viewed, downloaded or printed. The address is: <http://www-afpmb.acq.osd.mil/>

DPMIAC has also put together a package of information on the FYR. To receive a copy, please fill out the request form at the end of this TIB and return it to DPMIAC.

PUBLICATIONS OF INTEREST

Proceedings of the 1995 DoD Pest Management Workshop (Sustainable Integrated Pest Management for the Department of Defense: Vision for the 21st Century) - Copies of the proceedings of the meeting held at Naval Air Station, Jacksonville, Florida on January 22-27, 1995, are available from DPMIAC. To receive a copy mark the last page of the TIB and return it to DPMIAC. The Proceedings are also available on the AFPMB Home Page on the Internet.

IPM Strategies for Golf Course Maintenance - An environmental report from the Audubon Society of New York State dealing with IPM and the Audubon Cooperative Sanctuary Program for Golf Courses is available from DPMIAC. To receive a copy mark the last page of the TIB and return it to DPMIAC.



1996 Directory of Least-Toxic Pest Control Products - The November/December 1995 IPM Practitioner lists more than a thousand useful pest control items. The

Directory was compiled by IPM technical experts and includes specific product descriptions. With the current emphasis on pesticide use reduction, the information in this directory is pertinent to pest management professionals. Address: The IPM Practitioner, PO Box 7414, Berkeley, CA 94707, Tel: (510) 524-2567.

Gypsy Moth Management in the United States: A Cooperative Approach - The final environmental impact statement (EIS) is now available from the USDA, Forest Service and Animal and Plant Health Inspection Service. To request a copy contact: National Gypsy Moth EIS Team, USDA, Animal and Plant Health Inspection Service, 5 Radnor Corporate Center, Radnor, PA 19087-4585, Tel: (610) 975-4150.



SELECTED MEETINGS

FEBRUARY 5-9. Forest Insect Management Course - Sault Ste. Marie, ONTARIO. Eileen Harvey, Canadian Forest Service, Forest Pest Management Institute, 1219 Queen Street East, Sault Ste. Marie, Ontario, Canada P6A 5M7, Tel: (705) 757-5740 ext 2251, Fax: (705) 759-5728. E-mail: eharvey@pmoefpm.fpmi.forestry.ca

FEBRUARY 26 - MARCH 1. Biennial Army Medical Entomology Training Course - San Antonio, TX. COL Phillip Lawyer, DPMIAC/AFPMB, Forest Glen Sect., WRAMC, Washington, DC 20307-5001, Tel: (301) 295-7479, Fax: (301) 295-7483, DSN Prefix 295. E-mail: lawyerpg@acq.osd.mil

MARCH 18-21. 151st Meeting, Armed Forces Pest Management Board - Washington, DC. COL Don Driggers, AFPMB, Forest Glen Sect., WRAMC, Washington, DC 20307-5001, Tel: (301) 295-7476, Fax: (301) 295-7473, DSN Prefix 295. E-mail: driggedp@acq.osd.mil

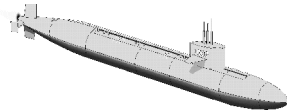
MARCH 22-29. 37th Meeting, Navy Occupational Health and Preventive Medicine Workshop - Virginia Beach, VA. Karen E. Pollok, Navy Environmental Health Center, 2510 Walmer Ave., Norfolk, VA 23513-2617, Tel: (804) 363-5454, DSN Prefix 864, Fax: (804) 444-3672. E-mail: workshop@ehc50.med.navy.mil Internet home page: <http://ehc40.med.navy.mil/-workshop>

MARCH 24-28. American Mosquito Control

Association/Mid-Atlantic Mosquito Control Association/Virginia Mosquito Control Association - Norfolk, VA. P.O. Box 5416, Lake Charles, LA 70606, Fax: (318) 478-9434.

JUNE 16-21. VII International Congress on Lyme Borreliosis - San Francisco, CA. Mary Ellen Fernandez, P.O. Box 2087, Fort Collins, CO 80522, Tel: (970) 221-6426.

COURSES FOR DoD PEST MANAGEMENT PERSONNEL



If you see any information that needs correcting or updating, please contact 1Lt Forcum, who can be reached at Tel: (301) 295-7479, DSN Prefix 295 or e-mail forcumch@acq.osd.mil

ARMY SPONSORED COURSES



1. For information on the following courses, contact: SFC Kenneth Jones, Academy of Health Sciences, U.S. Army, ATTN: MCCS-HPM, Fort Sam Houston, TX 78234-6100; Tel: (210) 221-5270/4278, DSN Prefix 471. Classes are conducted at Fort Sam Houston, TX.

Pest Management Technology - Core Instruction for Initial Certification:

18-22 MAR 96

6-10 MAY 96

5-9 AUG 96

Plant Pest and Vegetation Management - Initial Certification for Categories 3, 5 & 6:

25-29 MAR 96

13-17 MAY 96

12-16 AUG 96

Arthropod and Vertebrate Pest Management - Initial Certification for Categories 7 & 8:

1-5 APR 96

20-24 MAY 96

19-23 AUG 96

Recertification:

4-8 MAR 96

22-26 APR 96

9-13 SEP 96

2. For information on courses in Germany, contact: MAJ Tom Logan, HQ, USACHPPM-EUR, CMR 402,

Box 137, APO AE 09180; Tel: 49-6371-86-8540/44, DSN: 486-8540/44. Classes are conducted at the USACHPPM-EUR, Landstuhl, Germany.

3. For Information on courses taught at the Environmental Training Center, contact: Ms. Gail Boeff, ATTN: ATZR-BT, Fort Sill, OK 73503-5100; Tel: (405) 351-2111, Fax: (405) 351-5722, DSN Prefix 639. The Environmental Training Center at Fort Sill, OK conducts a variety of environmental, natural resources and occupational health courses.

NAVY SPONSORED COURSES

1. For information on the following courses, contact: Mr. F. De Masi, NDVECC, Naval Air Station Jacksonville, Box 43, Jacksonville, FL 32212; Tel: (904) 772-2424, Fax: (904) 779-0107, DSN Prefix 942. Classes are conducted at the Disease Vector Ecology and Control Center, NAS Jacksonville, Jacksonville, FL.

Medical Entomology and Pest Management Technology (B-322-1050):

5-16 FEB 96

3-14 JUN 96

8-19 JUL 96

Pesticide Applicator Training (Core) (B-322-1070), Instruction for Initial Certification:

4-11 MAR 96

9-16 SEP 96

Plant Pest and Vegetation Management (B-322-1071), Initial Certification for Categories 2, 3, 5 & 6:

12-15 MAR 96

17-20 SEP 96

Arthropod and Vertebrate Pest Management (B-322-1072), Initial Certification for Categories 7 & 8:

18-28 MAR 96

23 SEP - 3 OCT 96

Recertification Course (B322-1074), Category 8:

16-18 APR 96

19-21 NOV 96

Operational Entomology Training (B-322-1077), designed for A/D & Reserve PMTs, EHOs, Entomologists, Epidemiologists & others assigned to PM units:

6-17 MAY 96

21 OCT - 1 NOV 96

2. For information on the following courses, contact: Dr. W.E. Tozer, NDVECC, Naval Air Station Alameda, Building 130, Alameda, CA 94501-5039; Tel: (510) 263-2806, DSN Prefix 993. Classes are conducted at the Disease Vector Ecology and Control Center, NAS Alameda, Alameda, CA.

Medical Entomology and Pest Management Technology for Preventive Medicine Technicians (B-322-0017):

18 MAR - 12 APR 96

22 JUL - 16 AUG 96

Medical Entomology and Pest Management Technology (Reserve Training) (B-322-1050):

9-20 SEP 96 at Bangor, WA

Recertification Course (B-322-1074), Category 8:

23-26 APR 96 at NEPMU-5

3-6 SEP 96 at Bangor, WA

Shipboard Pest Management (B-322-1075): NDVECC(A)

14 FEB 96

13 MAR 96

17 APR 96

10 JUL 96 at Bangor, WA

21 AUG 96 at Bangor, WA

25 SEP 96 at Bangor, WA

Operational Entomology Training (B-322-1077), designed for A/D & Reserve PMTs, EHOs, Entomologists, Epidemiologists & others assigned to PM units:

26 FEB - 8 MAR 96 at NEPMU-6, Pearl Harbor, HI

AIR FORCE SPONSORED COURSES



1. To enroll in courses held at Sheppard AFB, contact: Programs Division, 2AF/DOP, Keesler AFB, MS 39534-5000; DSN: 597-1336. For information on the content of the following courses, refer to AFCAT 36-2223, USAF Formal Schools or contact: Mr. Hershell Bland, 366 TS/TSIM (Training Squadron/Training Squadron, Instructional Mechanical), 727 Missile Road, Sheppard AFB, TX 76311-2254; DSN: 736-5811, DSN Fax: 736-3345. Classes are conducted at Sheppard AFB, TX.

Pest Management Specialist (Certification), #J3AZR3E453 003 (previously #J3AZR56650-003). Initial Certification for Core, Categories 3,5,6,7 & 8:

2. For information on the following course, contact: Capt Duane L. Meighan, USAF School of Aerospace Medicine/EH, Brooks AFB, TX 78235-5123 at Tel: (210) 536-2058/59, DSN Prefix 240.

Operational Entomology Course (OEC) - #B30ZY43M3-000 is a two week training course that includes vector bionomics and vector-borne disease profiles, surveillance and control of vectors and vector-borne diseases, and information, intelligence, and perspectives on developing country operations during exercises, hostilities, and natural disasters. Academic instruction, practical exercises and field experiences simulate actual vector-borne disease surveillance and control situations: The course is designed to provide training for the following Air Force specialties and DoD personnel: public health officers (43H1/3); public health apprentices (4E031, E-2 and above with completion of 5-level CDC and the recommendation of your supervisor), journeymen (4E051), craftsmen (4E071), or superintendents (4E091); medical entomologists (43M1/3); flight surgeons (48A1/3 or 48P1/3); pest management apprentices (3E433, E-2 and above with completion of 5-level CDC and the recommendation of your supervisor), journeymen (3E453), craftsmen (3E473), or superintendents (3E490 with a prior AFSC 3E433, 3E453, and 3E473), or equivalent civilian pest management personnel; and other military and civilian public health and pest management personnel with the consent of the faculty. Quotas are obtained through the Unit or MAJCOM Training Managers. Army and Navy personnel may contact USAFSAM/EH to request attendance in OEC and are admitted as slots become available.

18-29 MAR 96

10-21 JUN 96

8-19 JUL 96

9 -20 SEP 96

3. For information on the following course, contact: Dr. Terry L. Biery, 757 AS/DOSE, YARS, Vienna, OH 44473-5000; Tel: (216) 392-1111/1178, DSN Prefix 346.

Aerial Application of Pesticides
(Certification) - #AAP-001
10-14 JUN 96

FEDERAL REGISTER

The following is compiled from the Federal Register (FR), which is a daily



listing of rules, proposed rules, and notices generated by U.S. Government agencies. Executive Orders, proclamations, and other documents from the President are also in the FR. Our listings include FR items which may be of interest to the DoD pest management and natural resources communities; environmental impact statement listings and other DoD items unrelated to pest and natural resource management generally are not included.

VOL 60 NO.190-210 (1-31 October 1995)

2-51398-417 Fish and Wildlife Service (FWS) - Action - Proposed Rule - ETWP; Proposed Endangered Status for Twenty-five Plant Species from the Island of Oahu, Hawaii.

2-51417-32 FWS - Action - Proposed Rule - ETWP; Proposed Endangered Status or Threatened Status for Fourteen Plant Taxa from the Hawaiian Islands.

2-51432-36 FWS - Action - Proposed Rule - ETWP; Proposed Threatened Status for the Guajon.

2-51436-443 FWS - Action - Proposed Rule - ETWP; Proposed Endangered Status for Three Plant Species (*Cyanea dunbarii*, *Lysimachia maxima*, and *Schiedea sarmentosa*) from the Island of Molokai, Hawaii.

2-51443-452 FWS - Action - Proposed Rule - ETWP; Proposed Endangered Status for Four Chaparral Plants from Southwestern California and Northwestern Baja California, Mexico.

4-51928-32 National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration NOAA - Action - Notice of Determination - ETWP; West Coast Pink Salmon Petition Determination.

4-51968-78 NMFS, NOAA - Action - Proposed Rule; Request for Comments - Threatened Fish and Wildlife; Change in Listing Status of Steller Sea Lions Under the Endangered Species Act.

11-52831-33 Animal and Plant Health Inspection Service (APHIS), USDA - Action - Interim Rule and Request for Comments - Imported Fire Ant Quarantined Areas.

11-52833-34 APHIS - Action - Final Rule - Mediterranean Fruit Fly; Regulated Articles and

Treatments.

25-54645-48 Environmental Protection Agency (EPA)

- Action - Proposed Rule; Correction - Land Disposal Restrictions-Phase IV: Issues Associated with Clean Water Act Treatment Equivalency, and Treatment Standards for Wood Preserving Wastes and Toxicity Characteristic Metal Wastes.

25-54687-88 EPA - Action - Notice - Certain Companies; Approval of Pesticide Product Registrations.

25-54688-89 EPA - Action - Notice - E. I. DuPont de Nemours and Company; Approval of Pesticide Product Registrations.

27-54938-39 APHIS - Action - Affirmation of Interim Rule as Final Rule - Witchweed; Regulated Areas.

VOL 60 NO.210 - 229 (1-30 November 1995)

1-55576-77 EPA - Action - Notice - Notice of Receipt of Requests for Amendments to Delete Uses in Certain Pesticide Registrations.

3-55777-81 APHIS - Action - Interim Rule and Request for Comments - Pine Shoot Beetle; Quarantined Areas and Regulated Articles.

8-56333-35 EPA - Action - Notice - Notice of Receipt of Requests to Voluntarily Cancel Certain Pesticide Registrations.

9-56533 FWS - Action - Notice of Priority Listing Activities - ETWP; Notice Describing Fish and Wildlife Service Priority Listing Activities From October 1, 1995 Through November 13, 1995.

9-56575 NMFS, NOAA - Action - Notice of Availability; Extension of Public Comment Period - Endangered and Threatened Species Direct Budgetary Cost Addendum to the Proposed Snake River Salmon Recovery Plan.

9-56639 APHIS - Action - Correction - Pine Shoot Beetle; Quarantined Areas and Regulated Articles.

13-56976-77 FWS - Action - Notice of Extension of Public Comment Period - ETWP; Notice of Extension of Comment Period on Reports and Other Data Pertaining to the Listing of the Bruneau Hot Springsnail.

17-57717-18 EPA - Notice - Notice of Receipt of Requests for Amendments to Delete Uses in Certain Pesticide Registrations.

17-57718-19 EPA - Notice - Notice of Receipt of Requests to Voluntarily Cancel Certain Pesticide Registrations.

27-58221-25 NMFS, NOAA - Action - Final Rule - Coral Reef Resources of Puerto Rico and the U.S. Virgin Islands; Initial Regulations; OMB Control Numbers.

27-58323 FWS - Action - Reopening of the Comment Period for the Proposed Special Rule - ETWP; Proposed Special Rule for the Conservation of the Northern Spotted Owl on Non-Federal Lands.

28-58634-35 FWS - Action - Notice of Document Availability and Public Comment Period - Availability of Draft Recovery Plan.

What do you think?

Please let us know how you feel about this publication.

Publication title/date: _____

Rate each category using this scale:

(5) = Highly Favorable, (4) = Favorable, (3) = Neutral, (2) = Unfavorable, (1) = Highly Unfavorable.

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The most useful sections are: _____

The least useful sections are: _____

☐ Put me on the Technical Information Bulletin

Mailing List. This periodical provides current information on pest management, pesticides, equipment, medical entomology, natural resources, laws and regulations, meetings and DoD courses.

Please send me the following Publications:

Technical Information Memoranda (TIM)

- ☐ NO. 5, Land Snails - Jun 1990
- ☐ NO. 11, Hydrogen Phosphide Fumigation with Aluminum Phosphide - Feb 1987
- ☐ NO. 13, Ultra Low Volume Dispersal of Insecticides by Ground Equipment - Mar 1985
- ☐ NO. 14, Personal Protective Equipment for Pest Management Personnel - Mar 1992
- ☐ NO. 15, Pesticide Spill Prevention & Management - Jun 1992
- ☐ NO. 16, Pesticide Fires: Prevention, Control & Cleanup - Jun 1981
- ☐ NO. 17, Pest Control Facilities - Replaced by MIL HDBK 1028/8A, - Nov 91
- ☐ NO. 18, Installation Pest Management Program Guide - Feb 1987
- ☐ NO. 20, Pest Management in Health Current Care Facilities - Oct 1989
- ☐ NO. 21, Pesticide Disposal Guide for Pest Control Shops - Oct 1986
- ☐ NO. 22, Guidelines for Testing Experimental Pesticides on DoD Property - Nov 1983
- ☐ NO. 23, Schistosomiasis - Jan 1987
- ☐ NO. 25, Devices for Electrocution of Flying Insects - Aug 1988
- ☐ NO. 26, Lyme Disease - Vector Surveillance and Control - Mar 1990

- ☐ NO. 27, Stored Products Pest Monitoring Techniques - Jun 1992
- ☐ NO. 29, IPM In and Around Buildings - Jul 94
- ☐ NO. 31, Contingency Retrograde Washdowns: Cleaning and Inspection Procedures - Dec 93
- ☐ NO. 34, Bee Resource Manual With Emphasis on the Africanized Honey Bee - Aug 95

Other Publications

- ☐ FYR Information Package
- ☐ IPM Strategies for Golf Course Maintenance
- ☐ Proceedings of the 1995 DoD Pest Management Workshop

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